Space Weather Forecast

Issued on Thursday, 23 February 2023 at 00:25 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate solar activity likely throughout (Minor/Moderate R1/R2 radio blackouts).

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been Moderate, with two low level Moderate-class flares in the last 24 hours, both from a large region in the northeast. There are now four numbered sunspot regions on the visible disc. The region in the northeast is the largest, and it maintains some magnetic complexity. A region in the north centre disk is also of note as this was the source of the Strong flare on the 17th, but has faded since then although it still has some limited magnetic complexity. The final sunspot worthy of comment is in the southeast, this region has slight magnetic complexity in its trailing portion, but this is starting to split apart. The other spot is small and simple.
Currently no significant Earth-directed Coronal Mass Ejections (CMEs) are forecast, although glancing impacts may occur on Thursday and Saturday.

Solar Wind / Geomagnetic Activity: Solar winds were indicative of some lingering CME influence but also a coronal hole fast wind. The wind speed has been slowly increasing, varying between 400-500 km/s. The Interplanetary Magnetic Field has been at mostly Moderate levels. The north-south component has varied mainly weakly, but occasionally reaching moderate levels. Geomagnetic activity was Quiet (Kp 0-2).

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary
Solar Activity: Moderate solar activity is likely to continue, with a slight chance of High activity. Three of the four regions on the disc present a flare risk, all of which should be present throughout the coming four days.

Solar Wind / Geomagnetic Activity: There are two low confidence CMEs in the forecast - one which may give a glancing blow early Day 1 (23 Feb). A second glancing blow from a CME is possible on Day 3 (25 Feb), but most of this should pass above Earth. Otherwise, Earth is experiencing a coronal hole fast wind, but this is likely to have only minor impacts and should gradually wane through Day 1. A further coronal hole may give Earth another fast wind during Day 3 with winds perhaps reaching elevated levels. The arrival time is low confidence. Geomagnetic activity is expected to be mostly Quiet to Unsettled, but Active intervals with a slight chance of a G1/Minor Storm are possible early on Day 1 with any CME arrival, also from late Day 2 through to Day 4 with a combination of HSS and possible CME glancing blows.

Energetic Particles / Solar Radiation: Solar radiation carries a slowly increasing slight chance of rising towards the S1 level, perhaps exceeding it, should any larger flares occur.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	5	20	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	50	50	50	50
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	15	15	20
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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